

## REMARKS

### Rejections under 35 U.S.C. § 103

The Examiner rejected claims 1-3, 5, 8, 9, 21 and 26 under 35 USC 103(a) as being obvious over U.S. Patent Application Publication No. 2001/0054758 to Harlan R. Isaak ("*Isaak*") in view of U.S. Patent No. 4,327,143 to Alvino et al. ("*Alvino*"). Applicant respectfully requests reconsideration of this rejection for the following reasons.

Claim 1, as currently stands, recites:

A microelectronic package array, comprising:

a first microelectronic package including a first carrier substrate having a first die side and a first non-die side, a first die electrically coupled to the first die side, and a land pad on the first die side;

a second microelectronic package comprising a second carrier substrate having a second die side and a second non-die side, a second die electrically coupled to the second die side, and a bond pad on the second non-die side; and

an intermediate substrate having a first side and a second side, the first side being coupled to the first die side of the first carrier substrate and the second side being coupled to the second non-die side of the second carrier substrate, the intermediate substrate comprising of a substantially solid core having a first side and a second side, the substantially solid core comprising of a material reinforced with a matrix to increase stiffness and control the coefficient of thermal expansion of the intermediate substrate. [underline added]

It is well settled that in order to establish a *prima facie* case of obviousness under 35 U.S.C. § 103, certain basic criterion must be met including the prior art reference or references **must teach or suggest all the claim limitations** and there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, **to modify a reference or to combine reference teachings**. See MPEP 2142 and 2143. Further, the teaching or suggestion to make the claimed combination must be found in the prior art, and **not based on applicant's disclosure**. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438

(Fed. Cir. 1991). Thus, in order for claim 1 to be obvious, *Isaak* in view of *Alvino* must disclose **every element recited** and **there must be a suggestion or motivation to combine or modify *Isaak* and *Alvino*.**

In the Final Office Action mailed on December 2, 2004, the Examiner alleges that as to claim 1:

Isaak differs from the claimed invention by not showing the intermediate comprising a material reinforced with a matrix to increase stiffness and control coefficient of thermal expansion of the intermediate substrate. However, Alvino et al. teach the core is a C-stage resin (column 12, lines 36-40). Additionally Alvino et al. teach the C-stage resin, the same material as the instant invention. Therefore, the C-stage resin of Alvino et al. is a resin material, which is good adhesion and an excellent flowability material. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Alvino et al. into the device taught by Isaak in order to eliminate the undesirable trace amounts of the material in the final product. See Final Office Action, page 3, paragraph beginning on line 5.

Applicant disagrees with this basis for alleging that claim 1 is obvious over *Isaak* in view of *Alvino*. In particular, Applicant respectfully submits that the Examiner's understanding of what is taught in Alvino is incorrect on several fronts and is baffled by the Examiner's stated rationale or motivation for combining the teaching of *Alvino* with the teachings of *Isaak*.

First, Applicant points out that several of the statements made by the Examiner (see above) are incorrect and further, do not address the issue of whether *Alvino* discloses the deficiencies of *Isaak* (i.e., an intermediate substrate containing a substantially solid core comprising a material reinforced with a matrix to increase stiffness and control the coefficient of thermal expansion of the intermediate substrate).

That is, Alvino was cited for the proposition that it discloses the deficiencies of Isaak. Applicant respectfully disagrees.

For example, the Examiner in the above recited paragraph alleges that “Alvino et al. teach the core is a C-stage resin (column 12, lines 36-40)” and that “[a]dditionally, Alvino et al. teach the C-stage resin, the same material as the instant invention.” However, claim 1 does not recite a “C-stage resin” but instead recites **an intermediate substrate** that includes a substantially solid core comprising **“a material reinforced with a matrix to increase stiffness and control the coefficient of thermal expansion of the intermediate substrate”** (see claim 1). Further, “the core” as disclosed in *Alvino* is related to a core of a printed circuit board and is not the core of an intermediate substrate of a microelectronic package array.

The Examiner further goes on to state the “C-stage resin of *Alvino* et al. is a resin material, which is *good adhesion* and *an excellent flowability material*.” As to this statement, Applicant first submits that this statement is inaccurate and second, it does not address the deficiencies of *Isaak* (i.e., **an intermediate substrate** that includes a substantially solid core comprising **“a material reinforced with a matrix to increase stiffness and control the coefficient of thermal expansion of the intermediate substrate”**). First, the Examiner is incorrect because it is well known that a “C-stage” resin relates to the third stage of a resin as it changes from, for example, a liquid form to a solid cured form (note that A- and B- stages represents the first two stages of the resin). As described in *Hawley’s Condensed Chemical Dictionary*, Richard J. Lewis Sr, 14<sup>th</sup> edition, Copyrighted 2001 by John Wiley & Sons, Inc. New York, C-stage resin relates to a “fully cross-linked phenol-formaldehyde resin, which is infusible and

insoluble in all solvents.” Thus, contrary to the Examiner’s assertions, “C-stage resin” has nothing to do with “good adhesion” or “excellent flowability material.” In fact, a “C-stage resin” will have the exact opposite characteristics, poor adhesion and poor flowability. Second, even if, for the sake of argument, these assertions made by the Examiner were correct, they do not disclose the deficiencies of *Isaak* (i.e., **an intermediate substrate** including a substantially solid core comprising **“a material reinforced with a matrix to increase stiffness and control the coefficient of thermal expansion of the intermediate substrate”**). Therefore, *Alvino* does not cure the deficiencies of *Isaak*.

Finally, the Examiner reasons that “it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of *Alvino* et al. into the device taught by *Isaak* in order to *eliminate the undesirable trace amounts of the material in the final product*” (italics added). Applicant respectfully disagrees with the Examiner’s motivation for combining the references and further submits that the statement is unclear as to why the teaching of *Alvino* is combinable with *Isaak*.

In particular, it is not clear as to what is meant by “undesirable trace amounts of the material in the final product.” That is, the Examiner does not discuss the meanings of “the material” and “the final product.” Absent of any other explanation by the Examiner, the Applicant assumes that the Examiner is referring to the statement “the B-stage sheet is free of crystal formations” at col. 12, lines 43-44. However, Applicant submits that such teaching is not a proper rationale or motivation for combining the cited references (i.e., *Isaak* and *Alvino*). That is, *Alvino* teaches to include a particular type of

curing agent into a "resin impregnated, B stage glass fabric material" in order to produce a B-stage sheet that is free of crystal formation. See col. 12, lines 35-44. Thus, the motivation that the Examiner cites for combining the teachings of *Alvino* with the teachings of *Isaak* is really the motivation for adding a particular curing agent to a B-stage glass fabric material and not a motivation for including a B-stage glass fabric material (e.g., a material reinforced with a matrix to increase stiffness and control the coefficient of thermal expansion of the intermediate substrate) to the core of an intermediate substrate of a microelectronic package array.

As a result, Applicant submits that the Examiner has failed to point out any teaching or suggestion in the prior art related to the **desirability** of the combination of the cited references (i.e., *Isaak* and *Alvino*). In this case, the rejection is using hindsight reasoning based on the present disclosure and culling the prior art to "produce" the claimed invention as recited by rejected claim 1.

For at least these reasons, Applicant respectfully submits that claim 1 is patentable over *Isaak* in view of *Alvino*. Independent claim 21 includes similar features as claim 1 and is therefore, likewise patentable over *Isaak* in view of *Alvino*. Claims 2, 3, 5, 8, 9 and 26 depend from and add additional features to claims 1 and 21. Thus, by virtue of their dependency, claims 2, 3, 5, 8, 9 and 26 are also patentable over *Isaak* in view of *Alvino*.

The Examiner rejected claim 4 under 35 USC 103(a) as being obvious over *Isaak* in view of *Alvino* in further view of U.S. Patent No. 5,591,355 to Davignon et al. ("*Davignon*"). Applicant respectfully submits that claim 4 is patentable over *Isaak* in view of *Alvino* in further view of *Davignon* for at least the following reasons.

Claim 4 depends from and adds additional features to claim 1. The deficiencies of *Isaak* in view of *Alvino* as discussed above for claim 1 are not overcome by *Davignon*. Therefore, for at least the reasons discussed above for claim 1, claim 4 is patentable over *Isaak* in view of *Alvino* in further view of *Davignon*.

The Examiner rejected claim 7 under 35 USC 103(a) as being obvious over *Isaak* in view of *Alvino* in further view of U.S. Patent No. 5,952,440 to Walisser et al. ("*Walisser*"). Applicant respectfully submits that claim 7 is patentable over *Isaak* in view of *Alvino* in further view of *Walisser* for at least the following reasons.

Claim 7 depends from and adds additional features to claim 1. The deficiencies of *Isaak* in view of *Alvino* as discussed above for claim 1 are not overcome by *Walisser*. Therefore, for at least the reasons discussed above for claim 1, claim 7 is patentable over *Isaak* in view of *Alvino* in further view of *Walisser*.

The Examiner rejected claim 10 under 35 USC 103(a) as being obvious over *Isaak* in view of *Alvino* in further view of U.S. Patent No. 5,840,417 to Bolger ("*Bolger*"). Applicant respectfully submits that claim 10 is patentable over *Isaak* in view of *Alvino* in further view of *Bolger* for at least the following reasons.

Claim 10 depends from and adds additional features to claim 1. The deficiencies of *Isaak* in view of *Alvino* as discussed above for claim 1 are not overcome by *Bolger*. Therefore, for at least the reasons discussed above for claim 1, claim 10 is patentable over *Isaak* in view of *Alvino* in further view of *Bolger*.

The Examiner rejected independent claim 11 under 35 USC 103(a) as being obvious over *Isaak* in view of *Alvino* in further view of U.S. Patent No. 6,054,337 to

Solberg ("*Solberg*"). Applicant respectfully submits that claim 11 is patentable over *Isaak* in view of *Alvino* in further view of *Solberg* for at least the following reasons.

Claim 11 has similar features as recited in claims 1 and 21. The deficiencies of *Isaak* in view of *Alvino* as discussed above for claim 1 are not overcome by *Solberg*. Therefore, for at least the reasons discussed above for claims 1 and 21, claim 11 is patentable over *Isaak* in view of *Alvino* in further view of *Solberg*.

The Examiner rejected claims 12, 13, 15, 18 and 19 under 35 USC 103(a) as being obvious over *Isaak* in view of *Alvino* in further view of *Solberg*. However, claims 12, 13, 15, 18 and 19 depend from and add additional features to claim 11. Thus, by virtue of their dependency, claims 12, 13, 15, 18 and 19 are patentable over *Isaak* in view of *Alvino* in further view of *Solberg*.

The Examiner rejected claim 14 under 35 USC 103(a) as being obvious over *Isaak* and *Solberg* in view of *Alvino* in further view of *Davignon*. Applicant respectfully submits that claim 14 is patentable over *Isaak* and *Solberg* in view of *Alvino* in further view of *Davignon* for at least the following reasons.

Claim 14 depends from and adds additional features to claim 11. The deficiencies of *Isaak* and *Solberg* in view of *Alvino* as discussed above for claim 11 are not overcome by *Davignon*. Therefore, for at least the reasons discussed above for claim 11, claim 14 is patentable over *Isaak* and *Solberg* in view of *Alvino* in further view of *Davignon*.

The Examiner rejected claim 17 under 35 USC 103(a) as being obvious over *Isaak* and *Solberg* in view of *Alvino* in further view of *Walisser*. Applicant respectfully

submits that claim 17 is patentable over *Isaak* and *Solberg* in view of *Alvino* in further view of *Walisser* for at least the following reasons.

Claim 17 depends from and adds additional features to claim 11. The deficiencies of *Isaak* and *Solberg* in view of *Alvino* as discussed above for claim 11 are not overcome by *Walisser*. Therefore, for at least the reasons discussed above for claim 11, claim 17 is patentable over *Isaak* and *Solberg* in view of *Alvino* in further view of *Walisser*.

The Examiner rejected claim 20 under 35 USC 103(a) as being obvious over *Isaak* and *Solberg* in view of *Alvino* in further view of *Bolger*. Applicant respectfully submits that claim 20 is patentable over *Isaak* and *Solberg* in view of *Alvino* in further view of *Bolger* for at least the following reasons.

Claim 20 depend from and add additional features to claim 11. The deficiencies of *Isaak* and *Solberg* in view of *Alvino* as discussed above for claim 11 are not overcome by *Bolger*. Therefore, for at least the reasons discussed above for claim 11, claim 20 is patentable over *Isaak* and *Solberg* in view of *Alvino* in further view of *Bolger*.

The Examiner rejected claims 22-25 under 35 USC 103(a) as being obvious over *Isaak* in view of *Alvino* in further view of U.S. Patent No. 5,145,303 to Clarke ("*Clarke*"). Applicant respectfully submits that claims 22-25 are patentable over *Isaak* in view of *Alvino* in further view of *Clarke* for at least the following reasons.

Claims 22-25 depend from and add additional features to claim 21. The deficiencies of *Isaak* in view of *Alvino* as discussed above for claim 21 are not overcome by *Clarke*. Therefore, for at least the reasons discussed above for claim 21, claims 22-25 are patentable over *Isaak* in view of *Alvino* in further view of *Clarke*.



The Examiner rejected claim 27 under 35 USC 103(a) as being obvious over *Isaak* in view of *Alvino* in further view of *Davignon*. Applicant respectfully submits that claim 27 is patentable over *Isaak* in view of *Alvino* in further view of *Davignon* for at least the following reasons.

Claim 27 depends from and adds additional features to claim 21. The deficiencies of *Isaak* in view of *Alvino* as discussed above for claim 21 are not overcome by *Davignon*. Therefore, for at least the reasons discussed above for claim 21, claim 27 is patentable over *Isaak* in view of *Alvino* in further view of *Davignon*.

**Conclusion:**

In view of the foregoing, claims 1-5, 7-15, and 17-27 are in condition of allowance. Early issuance of Notice of Allowance is respectfully requested. The Examiner is encouraged to telephone the undersigned if there are any remaining questions of patentability, and a telephone interview would be helpful in resolving these questions.

The Commissioner is hereby authorized to charge shortages or credit overpayments to Deposit Account No. 500393.

Respectfully submitted,  
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Dated: \_\_\_\_\_

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